Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April / May – 2017**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| **Code :** | **14CE2013** | **Duration :** | **3hrs** |
| **Sub. Name :** | **DESIGN OF STEEL STRUCTURES** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q. No. | Sub Div. | Questions | Course  Outcome | Marks |
| 1. | a. | List the different sizes of bolts available in market. | CO1 | 2 |
| b. | Describe the modes of failures of bolted connections. | CO1 | 3 |
| c. | A lap joint is made between two plates of 10mm thickness with 6 numbers of 16mm black bolts (G 4.6). Find the joint capacity. Bolts are fully threaded. Ultimate tensile strength of bolts is 400N/mm2 and Ultimate tensile strength of plate is 410N/mm2. | CO2 | 15 |
| (OR) | | | | |
| 2. | a. | Express the meaning of Avg and Atg. | CO1 | 2 |
| b. | List the advantages of structural steel. | CO1 | 3 |
| c. | A single angle ISA 80X80X10mm is connected to a 12mm gusset plate with 5 nos.of 16mm bolts to transfer tension. Take wi = 40mm.Determine the design tensile strength of the angle. | CO2 | 15 |
| 3. | a. | Design a single angle section for a tension member of a roof truss to carry a factored tensile force of 275kN. The member is subjected to the possible of stress due to the action of wind. The effective length of the member is 3m. Use 20mm shop bolts of grade 4.6 for te connection. | CO2 | 18 |
|  | b. | Sketch the battened column with end stiffener and intermediate stiffener. | CO1 | 2 |
| (OR) | | | | |
| 4. | a. | Give the various modes of failure in tension members . | CO1 | 3 |
|  | b. | Design a bridge compression member of 2 channels placed toe to toe. The length of two members is 8m. It carries a load of 1520kN. The width over the backs of channels is to be decided by the designer consider practical point of view. If the channels are connected by lacings, design the lacing system. | CO2 | 17 |
| 5. |  | A hall of clear dimensions 16m x 7m is to be covered with RCC slab flooring 120mm thick resting over RS joists spaced at an interval of 2.8 m centre to centre. Terrazzo finishing 20mm thick is to be provided over the RCC slab. The live load on the slab is 3.5 kN/m2. The joints are resting over 300mm thick walls. Design the floor joists by taking the unit weight of RCC and finishing as 25kN/m3. | CO2 | 20 |
| (OR) | | | | |
| 6. | a. | Describe the necessity of column base for a steel building and its classification. | CO1 | 5 |
|  | b. | Design a slab base for a column ISHB 400 @ 774 N/m carrying an axial factored load of 1000kN. M15 concrete is used for the foundation. Provide bolted connection between column and base plate. | CO2 | 15 |
| 7. | a. | Elaborate the procedures of wind analysis in roof truss design. | CO3 | 15 |
|  | b. | Give the various types of roof trusses. | CO3 | 5 |
| (OR) | | | | |
| 8. | a. | Comment on the load combinations in the design of truss. | CO3 | 5 |
|  | b. | Analyze the roof truss shed is to be built in Lucknow for an industry. The size of shed is 24 x 40m . The height of building is 12m at the eves. | CO3 | 15 |
|  | | **Compulsory:** |  |  |
| 9. | a. | List the types of stiffeners provided in the plate girder and its uses. | CO2 | 4 |
|  | b. | Design a welded plate girder of 24m span to support a uniformly distributed live load of 65 kN/m over the span use Yield stress of steel = 250 N/mm2.Design the cross sectional details of the plate girder to conform to the specifications of IS 800-2007. | CO2 | 16 |